

Though I do not pretend to compete with Mr. Jeffreys as a collector of British shells, I have possessed greater opportunities of collecting native species than of the shells of foreign countries. Having devoted more time and labour to our native species, my cabinet is proportionately better furnished with them; consequently I cannot agree with Mr. Jeffreys as to the cause of the difference between us, and the error into which one of us has fallen, but concur with him in the hope that further experience will show which of our conclusions is correct.

Having now gone over Mr. Jeffreys's remarks, paragraph by paragraph, it remains for me to add that I have stated nothing as fact which I am not prepared to prove by reference to specimens in my own cabinet. I mentioned in my last communication, and I repeat it now, that nothing could be easier to me than to multiply instances in support of my views, but conceive that my doing so now would be a waste of time, as I have cited sufficient for the purpose.

In conclusion, I beg to remark that, in order to sustain the theory propounded and advocated by Mr. Jeffreys, it should be proved to hold good both within and without the Mediterranean: it should be shown that the Mollusca of the coasts of Piedmont (situated only six or seven degrees south of the southernmost shores of England, and one or two degrees north of Vigo) are larger in size than the Mollusca of the Mediterranean generally; they should be as much larger than the specimens of Gibraltar and Malta as they are smaller than the British. I would also suggest that the British seas extend through above ten degrees of latitude, and have been more thoroughly explored than any other part of the world of similar extent; and if Mr. Jeffreys's proposition held good within their area, it could hardly have escaped the notice of the numerous collectors and naturalists who have made our coasts the scene of their labours.

BIBLIOGRAPHICAL NOTICES.

Handbook of the British Flora. By G. BENTHAM, F.L.S.
London: Lovell Reeve. 1858.

A FEW years since, the *Flora* by Hooker and Arnott was the textbook and rallying point of that "school" of English botanists who professed to remain satisfied with a moderate subdivision of species, and were disposed to defer accepting, until tested by cultivation, the so-called "sub-species," which have been generally adopted as species upon the European continent, and which had to some extent been recommended to the British student in Babington's Manual.

The followers of Hooker and Arnott let us call by way of illus-

tration the "Conservatives," then those of Babington will represent the "Liberal" or "Progress" party.

Such were in the main the respective positions of the two schools five years ago; and many of our best local botanists thought that the *combining* process had been used too freely by the "Conservatives."

Now a step diverging still further has been taken on either side: Bentham's Handbook is, in its estimate of the *number* of British plants, even more remarkably different from Hooker and Arnott's Flora than the latter work is from Babington's Manual. Mr. Bentham's views will represent a third section, which may be termed (from its attachment to ancient precedent) the "High Tory" party, as the minutely-examining school of Alexis Jordan of Lyons will in turn represent the "Radical Reformers," hardly numerous or yet popular, botanically, with us. Those who prefer to rely upon individual opinion will be the "Free-thinkers" in botany.

As in politics, each of these parties has its use; and their different manner of viewing the question arises naturally out of their method of study.

The physiological botanist is more likely to see resemblances than differences; for he traces the unity of plan and analogy of function through all the endless varieties of plants.

The geographical botanist, too, from the very nature of his studies, requires a certain amount of simplicity (would that we could say *uniformity*!) in the value of species. He cannot hope to follow *over-refined* "splits" through their whole range, when some of them are only just announced from a few scattered localities, and when it may require years of study, and a greater increase in the number of accurate observers than could be expected, before anything certain can be known of their distribution.

Hence the "Conservative" school derives no small part of its credit and importance from the high names which are associated with it. But that the study of geographical botany is not altogether opposed to the exact discrimination of species, is sufficiently proved by the example of Mr. H. C. Watson, who, in his 'Cybele Britannica,' walked nearly hand in hand with Babington's successive editions; but it must be remembered he was working in a limited field of observation.

In his more manageable "field," the local botanist of inquiring mind, who has leisure and taste for such studies, will be found carefully tracing out all these minutiae, not necessarily with the view of founding new species, but with the desire of acquiring a knowledge of his plants as exact as possible. Nor is he by any means to be called a useless contributor to the science. He often shows the way to some species hitherto overlooked; it is to him we are usually indebted for an intimate knowledge of varieties, and especially of "Hybrids;" and, more than to any other, for the detection of new localities for the Linnaean species. Thus it is not to be wondered at if we find Babington's Manual the favourite text-book with the most advanced of British botanists.

After all, it may be but a matter of choice whether, from opportunities of travel, or of consulting herbaria and botanical gardens, we endeavour to master many distinct forms (let us say "sub-genera"), or turn our attention to the thorough discrimination of what lies close at our feet. An equal amount of labour may be given in either case, and, if conscientiously bestowed, not lost.

These remarks will have prepared our readers to expect, from a botanist of the experience of Mr. Bentham, views of a decidedly collective tendency. His estimate of the value of a species he considers as founded upon the "Linnæan" standard: and certainly this plan offers many *conveniences* to the general and geographical botanist. We know further, from his paper read before the Linnæan Society in March 1857 (*Journal of Proceedings*, ii. 30), that our author is prepared to take the same course with respect to the *genera* and *orders*, so far as established by Linnæus, as he recommends a return to the use of them also, "*for the purpose of language*," and to give to the subordinate groups of suborders and subgenera a sectional value only, with *no names at all*.

This course Mr. Bentham considers the only escape from the inevitable confusion and ever-increasing difficulties which arise from the daily addition of new names.

Now we do not pretend to say whether, as regards species, this is to be considered as merely the philosophical view of a botanist of large experience, or whether such a plan equally recommends itself from the facility which it affords to the young student of English botany. The High Tory leader, however, as sometimes happens in politics, addresses himself to the illiterate class. Here we cannot help suspecting that our author is smoothing the road for the beginner where he has travelled too cursorily himself.

The professed object of Mr. Bentham is to render the student's first steps as easy as possible: that he should afterwards complete his studies in a more exact school is implied; and, indeed, without this, he would soon lose interest, if he should wish to confine his attention to British botany.

The means used to facilitate the beginner's studies are:—

1. Condensation of species to the supposed standard of Linnæus, or beyond it.

2. The use of the dichotomous method of Lamarck, as an analytical key to the orders, genera, and species. (This is likely to prove the most successful part of the book.)

3. Simplicity, and English terms, as far as possible, in the descriptions; and *English names* for the orders, genera, and species.

4. A concise, and eminently lucid, introduction to the knowledge of the structure of plants, and of the terms employed in their description.

The following is Mr. Bentham's definition of a *species*:—It "comprises all the individual plants which resemble each other sufficiently to make us conclude they are all, or may have been all, descended from a common parent. These individuals may often differ from each other in many striking particulars, such as colour of the flower,

size of the leaf, &c.; but these particulars are such as experience teaches us are liable to vary in the seedlings raised from one individual.

"When a large number of individuals of a species differs from the others in any striking particular, they constitute a *variety*. If the variety generally comes true from seed it is often called a *race*. A variety can only be propagated with certainty by grafts, cuttings, bulbs, buds. . . . A *race* may with care be propagated by seed, though the seedlings will always be liable to lose those particulars which distinguished it from the rest of the species.

"A REAL SPECIES will *always* come true from seed" (p. 26 of Introduction). We hope the test of careful cultivation is rigorously carried out at Kew or elsewhere, under the accurate and observant eye of our author; otherwise, he is only setting problems without attempting to solve them himself, or even ascertaining if they admit of solution.

One of the most distinctive features of the 'Handbook' is the prominence given to English names. As in the standard series of zoological works published by Van Voorst, the English specific names take precedence of the Latin: here our author abjures his own principle of "ancient precedent."

Perhaps in those Utopian days when botany shall be taught in every village school, Mr. Bentham's English names may obtain general currency. At present they seem to add one more difficulty to a synonymy already encumbered. An experiment which has failed among the French (a nation never the last to adopt a desirable novelty) is hardly likely to succeed upon the more conservative side of the Channel.

Great pains have been bestowed upon an idea which, like the decimal system of coinage, must find a most serious obstacle to its introduction in long-continued use, even if the advantages offered by the adoption of English names were not far outweighed by other considerations, such as the reason above given.

Another novelty to British botanists is the outline of its foreign range, which is given after each species, as well as a general summary of its distribution in Britain; the latter derived from Mr. Watson's 'Cybele Britannica.' But views that condense many plants under one name lead naturally to inexact views of geographical distribution, and we should not be surprized to find that the range of many species is made to appear wider than it really is.

The introduced plants, "aliens," &c., receive little favour at the hands of Mr. Bentham; and here we believe he has acted very judiciously. The thoroughly naturalized plants, however, as well as the colonists, stand, in the text, upon equal terms with the indigenous species: we regret that our author did not conform to the practice, so usually adopted, of distinguishing these interlopers by some "brand" indicative of their foreign origin, assumed or known.

It is well observed of the "colonists," that "in some instances it would appear that the whole of the land they originally inhabited is now in a state of cultivation; so that if omitted from one *Flora* they

must, for the same reason, be rejected from almost every other one,"—an argument, by the way, which has been employed to account for our ignorance of the original "*specific centres*" of the cereals themselves.

Great stress is laid upon judging of the claims of plants to be regarded as natives from the knowledge of their whole "*area*," or general distribution, much in the same way as recommended by Alphonse DeCandolle; but those who have perused the fourth volume of Mr. Watson's '*Cybele*' are aware how much there is to be said upon the other side about the high importance to be attached to the "*nature of the station*" and to the circumstances under which the suspected plant occurs. As often remarked, allowance must also be made for the extreme rarity of some species that are probably natives, though with us at the outskirts of their range, or become very much rarer than was formerly the case by the cultivation and drainage of land.

The '*Handbook*' is no mere compilation, for its author tells us he has conscientiously re-examined his plants, and compared them with *Continental specimens* of the same species.

We have some misgivings whether the tyro is likely to acquire a just appreciation of the value or limits of a species when he is taught to include under one name no less than five plants (as in the case of *Cerastium vulgatum*), which amounts to little more than recognizing a subsection or subgenus. We suspect that the beginner's belief in the existence of a species at all will be not a little shaken when he gathers, growing side by side, two plants so different as *Cerastium glomeratum* and *C. semidecandrum*, and yet is told they are identical. Nevertheless, no proof has been adduced from cultivation; no intermediates occur among hundreds of both kinds; and at the same time nearly all systematic botanists are agreed to believe that a species has limits somewhere, though we may not yet have found them. The conflicting opinions on this subject, even within the bounds of a Flora so small as that of Britain, sufficiently show that it is not in books we must look for these limits.

We have space for only a few instances of Mr. Bentham's sweeping combinations, for most of which no reason is given, except the opinion of the author, or the authority of some eminent, but often ancient, writer.

We much regret this omission, as it can hardly be expected that the "Liberal" or "Progress" party, far less the "Radicals," will submit to such despotic assumptions without ample proof.

There is but one *Arctium*. Ah, lucky tyro! how we envy him a load of difficulties removed at one stroke of the pen!

The *Ranunculi*, of the *Batrachium* section, are all swamped under one species; but if we have our old friend *R. aquatilis* restored to its ancient dignity, it must feel somewhat alarmed at finding itself at the head of a larger family than it ever acknowledged before.

Similar amalgamations will be found under *Potamogeton pusillus*, which now includes a whole section of narrow-leaved species.

Potamogeton natans is joined to *P. oblongus*, and also to *P. plan-*

tagineus. But, in the case of some of the other species, we commend Mr. Bentham's views to the careful study of the minutely-examining botanist. Aquatics, above all other plants, are liable to variation, and much remains to be learned in the genus *Potamogeton* concerning the effect of stagnant or running, deep or shallow, fresh or brackish water.

Carex distans includes no less than four others.

C. arenaria takes in *C. intermedia*.

C. axillaris is united (unwillingly, we are sure) to *C. Bönninghausiana*,—a combination against which we strongly protest, as it seems to us that the latter is far more nearly related to *C. paniculata*.

Galium uliginosum joins *G. Witheringii*; *G. pusillum* joins *G. saxatile*; *Salicornia radicans* is lost under *S. herbacea*; and many more instances might be quoted, but the details are so completely and clearly given in the sixth chapter of the 'Cybele Britannica,' vol. iv., that it is needless to repeat them here.

Other pairs of species have been treated more tenderly. *Valerianella carinata* continues separate from *V. olitoria*; *V. auricula* from *V. dentata*. *Orchis latifolia* is allowed to pass as distinct from *O. maculata*; *Polygonum Persicaria* from *P. lapathifolium*; *Myosotis sylvatica* from *M. arvensis*. It may be asked, "Why should not these have fared like the former?" We think that here is only one proof more that there is no means of dividing equidistantly species which are not the links of a linear series, and which are hardly better likened to the knots which join the meshes of a net. Might we not say that they may more resemble variously intersecting lines of dots spread over a sphere so as to display in all their affinities, resemblances, and analogies, the unity of plan which existed in the mind of the ONE CREATOR, rather than the necessity that we should consider His creatures descended from a few main types?

We take leave of Mr. Bentham's 'Handbook' with a ready acknowledgment of the many novelties which he has introduced for the first time to the English student of botany, and with the hope (not without considerable misgiving) that his book may be found as useful a guide to the beginner as could be wished by its accomplished author.

May it induce many to enter the ranks of the votaries of our gentle and instructive craft; for indeed there is work and pleasure enough for all.

First Traces of Life on the Earth; or, the Fossils of the Bottom-rocks.

By S. J. MACKIE, F.G.S. &c. Groombridge, 1860.

THE study of Geology introduces us to many different stages in the Earth's history, where we may behold more or less distinctly the several successive phases which this planet has, time after time, put on. The masters in the science, the professional geologists, and the amateurs have all contributed to the accumulation of the facts and the construction of the theories whereof the science now consists, and by the aid of which the graphic portraiture of the earth's earlier